# Title

INFLUENCE OF THE CURING DEGREE ON THERMO-MECHANICAL PROPERTIES AND MODE I FRACTURE TOGHNESS OF A NEAT AND CARBON FIBRE-REINFORCED EPOXY FORMULATION

# Abstract text

While epoxy resin matrix composites are now widely used in the aerospace and sporting goods industry and increasingly also in automotive and other vehicle and machinery applications, there is still a need to economise on processing cycles, which is a reduction in resin cure temperatures and times. As the latter parameters directly affect the degree of cure (or degree of resin conver-sion) and thus the composite performance profile, a systematic study was undertaken on the effect of the degree of cure on key neat resin properties. These included the modulus, the glass transition temperature and the fracture toughness using a commercial 180 °C degree cure epoxy resin formulation that was cured to a conversion ranging from 80 to 100 %. The glass transition temperature and modulus values were found to increase and decrease, respectively, with increasing conversion. Simultaneously, fracture energy values reached a plateau at about 83 % of cure. Furthermore an analogous test program was carried out to evaluate the applicability and limitations of the results of the characteristic neat resin properties on specimens made of carbon fibre reinforced composites with quasi-unidirectional lay-up. A good correlation between the key neat resin and laminate properties was established. Hence the developed test methodology is basically suitable for carrying out an effective material characterisation of neat resin formulations for high performance composite applications applying structure-property relations (neat resin level vs. laminate level).

**Authors** 3

WOLFAHRT, WOLFAHRT (POLYMER COMPETENCE CENTER LEOBEN GMBH, LEOBEN, AUS)

PILZ, PILZ (INSTITUTE OF MATERIALS SCIENCE AND TESTING OF POLY)

REINHOLD, LANG (INSTITUTE OF POLYMERIC MATERIALS AND TESTING, JOHA)